Small Business Innovation Research/Small Business Tech Transfer

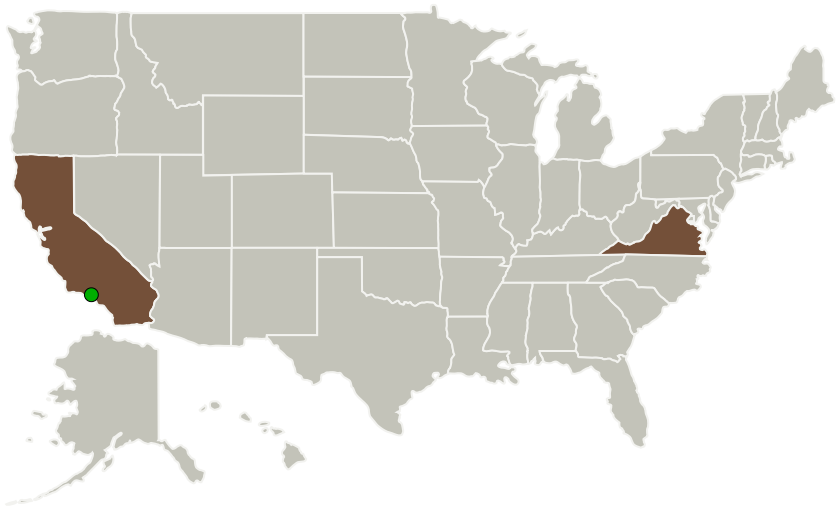
Integrated Visualization Environment for Science Mission Modeling, Phase II

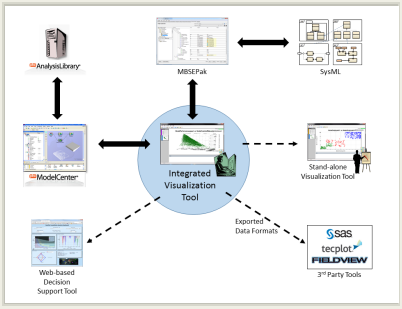
Completed Technology Project (2014 - 2016)

Project Introduction

NASA is emphasizing the use of larger, more integrated models in conjunction with systems engineering tools and decision support systems. These tools place a corresponding stress on legacy engineering visualization systems which now are required to handle larger data sets, provide more intuition to the user, integrate well with many other tools, and help the user with his/her ultimate goal: improving the design of complex systems. Phoenix Integration proposes to complete the prototype visualization environment created during Phase I to the point where it is a commercially viable product. New features, refinements, and integration with other tools will be accomplished in Phase II. In particular, the work will involve major improvements to whitespace exploration algorithms, techniques that enable users to unconstrain or modify the underlying engineering model in an effort to obtain results in previously unattainable areas. Work will also include more data mining algorithms (e.g. Principal Component Analysis), new graph types (e.g. spider plots), export formats to 3-D tools (e.g. Tecplot), integration with MBSE/SysML tools, integration with web-based decision support environments, and incorporation of probabilistic analysis. A rich integration with ModelCenter, the company's engineering integration and trade study environment, is planned, although a standalone capability will also be offered. The visualizer's architecture will be based on OpenGL and will use the GPU to parallelize rendering computations. Design will focus on usability and responsiveness, with the goal of providing quick insight into complex data. The tool will be user-tested through early adopters to ensure relevance and to guide development.

Primary U.S. Work Locations and Key Partners





Integrated Visualization Environment for Science Mission Modeling, Phase II Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Phoenix Integration	Lead Organization	Industry	Blacksburg, Virginia
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

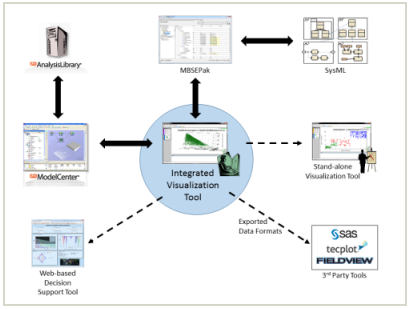
May 2014: Project Start

November 2016: Closed out

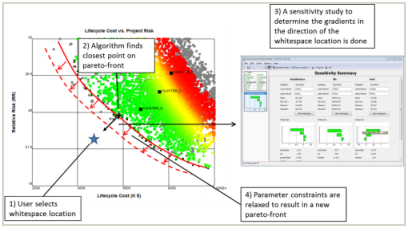
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137473)*

Images



Briefing Chart Image
Integrated Visualization Environment for Science Mission Modeling, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/133445)*



Final Summary Chart Image
Integrated Visualization Environment for Science Mission Modeling, Phase II Project Image *(https://techport.nasa.gov/image/133319)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Phoenix Integration

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

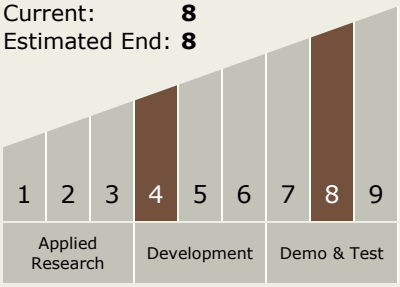
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Andy Ko

Technology Maturity (TRL)

Start: **4**
Current: **8**
Estimated End: **8**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System